IS 4843 (1968): Code for designation of ferrous castings [MTD 14: Foundry]

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IS : 4843 - 1968
(Reaffirmed 2003)

Indian Standard

CODE FOR DESIGNATION OF FERROUS CASTINGS

(Second Reprint AUGUST 1982)

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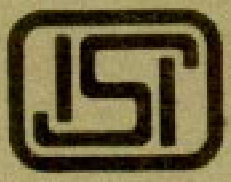

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Indian Standard

CODE FOR DESIGNATION OF FERROUS CASTINGS

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Panel for Code for Designation of Ferrous Castings, SMDC 1 : P11

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Indian Standard

CODE FOR DESIGNATION OF FERROUS CASTINGS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 8 October 1968, after the draft finalized by the Metal Standards Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 A code for designation of ferrous castings will be an important step towards identification, uniform marking of products and drawings. Such a standard designation would greatly help the manufacturers and the users of the products concerned.

0.3 This standard has been co-ordinated with the following codes for designation, so that certain measure of uniformity is achieved in the designations:

*IS : 1762-1961 Code for designation of steel

*IS : 2084-1962 Code for designation of pig iron

IS : 2085-1962 Code for designation of ferro-alloys

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1. SCOPE

1.1 This standard lays down the principles for code designation of ferrous castings.

2. GENERAL

2.1 Ferrous castings shall be designated by a group of symbols indicating the important characteristics in the following order:

a) Type of castings, and

b) Mechanical properties or chemical composition.

*Since revised.

3. SYMBOLS FOR TYPE OF CASTINGS

3.1 Various castings shall have code designations as given below:

Ferrous Castings	*Designation*
a) Grey iron	FG
b) *Malleable iron*	
1) Black-heart	BM
2) Pearlitic	PM
3) White-heart	WM
c) Spheroidal or nodular graphite iron	SG
d) Austenitic flake graphite iron	AFG
e) Austenitic spheroidal or nodular graphite iron	ASG
f) Abrasion resistant iron	ABR
g) Steel castings	CS
h) Heat-resistant steel castings	CSH
j) Corrosion-resistant steel castings	CSC

4. SYMBOL FOR MECHANICAL PROPERTIES

4.1 The tensile strength in kgf/mm^2 to follow the group symbol shall be the minimum for the 30-mm section in case of grey iron castings and the minimum for the heaviest section in case of various other castings. Where the minimum tensile strength requirement does not vary with the sectional thickness within the same grade, the group symbol shall be followed by the minimum tensile strength indicated for the grade. In the case of spheroidal or nodular graphite iron castings, the tensile strength shall be followed by the minimum elongation on gauge length $5{\cdot}65\sqrt{S_0}$.

5. SYMBOL FOR CHEMICAL COMPOSITION

5.1 In the case of grey iron castings where chemical composition is more important than the tensile properties and for alloy iron and alloy steel castings, the group symbol shall be followed by the chemical symbol in accordance with IS : 1762-1961*.

*Code for designation of steel. (Since revised).

6. EXAMPLES

6.1 In order to illustrate, examples of code designations in accordance with this standard are given below:

a) **Grey Iron Castings**

1) *General Engineering Castings*

Sectional Thickness of Castings mm	Diameter of Test Bar as Cast mm	Tensile Strength kgf/mm² *Min*	Designation
4 up to 8	13	19	FG 15
Over 8 up to 15	20	17	
Over 15 up to 30	30	15	
Over 30 up to 50	45	13	
15 up to 30	30	40	FG 40
Over 30 up to 50	45	37	

2) *Special Grey Iron Castings Where Chemical Composition is More Important, Such as Ingot Mould Castings*

Chemical Composition		Designation
Element	*Percent*	
Carbon equivalent (C + 0·3 Si + P)	4·0 to 5·1	FG 35 Si 15
Total carbon, *Min*	3·5	
Silicon	1·20 to 1·80	
Manganese	0·60 to 0·90	
Chromium, *Max*	0·15	
Copper, *Max*	0·10	
Sulphur, *Max*	0·080	
Phosphorus, *Max*	0·400	

b) **Malleable Iron Castings**

1) *Black-Heart Malleable Iron Castings*

Sectional Thickness of Castings mm	Diameter of Test Bar as Cast mm	Tensile Strength kgf/mm² *Min*	Designation
All sizes	15	35	BM 35
All sizes	15	32	BM 32
All sizes	15	30	BM 30

2) *Pearlitic Malleable Iron Castings*

Sectional Thickness of Castings mm	Diameter of Test Bar as Cast mm	Tensile Strength kgf/mm² *Min*	Designation
All sizes	15	70	PM 70
All sizes	15	65	PM 65
All sizes	15	55	PM 55
All sizes	15	50	PM 50
All sizes	15	45	PM 45

3) *White-Heart Malleable Iron Castings*

Sectional Thickness of Castings mm	Diameter of Test Bar as Cast mm	Tensile Strength kgf/mm² *Min*	Designation
8 and under	9	36	WM 42
Over 8 up to 13	12	40	
Over 13	15	42	
8 and under	9	28	WM 35
Over 8 up to 13	12	32	
Over 13	15	35	

c) **Spheroidal or Nodular Graphite Iron Castings**

Tensile Strength kgf/mm² *Min*	Elongation, Percent *Min*	Designation
	on Gauge Length $l_0 = 5d$	
80	2	SG 80/2
70	2	SG 70/2
60	2	SG 60/2
50	7	SG 50/7
42	12	SG 42/12
38	17	SG 38/17

d) **Austenitic Flake Graphite Iron Castings**

Chemical Composition		Designation
Element	*Percent*	
Carbon, *Max*	3·00	AFG Ni 16 Cu 7 Cr 2
Silicon	1·00 to 2·80	
Manganese	1·00 to 1·50	
Nickel	13·5 to 17·5	
Copper	5·50 to 7·50	
Chromium	1·00 to 2·50	

e) **Austenitic Spheroidal or Nodular Graphite Iron Castings**

Chemical Composition		Designation
Element	*Percent*	
Carbon, *Max*	3·00	ASG Ni 20 Cr 2
Silicon	1·00 to 2·80	
Manganese	0·70 to 1·50	
Nickel	18·0 to 22·0	
Chromium	1·00 to 2·50	
Phosphorus, *Max*	0·080	

f) **Abrasion-Resistant Iron Castings**

Chemical Composition		Designation
Element	*Percent*	
Total carbon	3·0 to 3·6	ABR 33 Ni 4 Cr 2
Graphite carbon, *Max*	0·10	
Silicon	0·3 to 0·8	
Manganese	0·3 to 0·8	
Nickel	3·3 to 5·0	
Chromium	1·4 to 2·5	
Molybdenum, *Max*	0·75	
Sulphur, *Max*	0·15	
Phosphorus, *Max*	0·30	

g) **Steel Castings**

1) *Unalloyed* (*General Engineering*) *Steel Castings*

Tensile Strength kgf/mm² *Min*	Designation
125	CS 125
105	CS 105

85	CS 85
71	CS 71
55	CS 55
47	CS 47
41	CS 41

2) *Unalloyed Special (High Magnetic Permeability) Castings*

Tensile Strength kgf/mm²	Designation
35 to 44	CSM 35
41 to 50	CSM 41

3) *Alloy Steel Castings*

Chemical Composition		Designation
Element	*Percent*	
Carbon	0·45 to 0·55	CS 50 Cr 1 V 20
Silicon	0·10 to 0·35	
Manganese	0·50 to 0·80	
Chromium	0·90 to 1·20	
Vanadium, *Min*	0·15	

h) **Heat-Resistant Steel Castings**

Chemical Composition		Designation
Element	*Percent*	
Carbon	1·20 to 1·40	CSH 130 Ni 6 Cr 28
Silicon, *Max*	2·00	
Manganese, *Max*	1·00	
Chromium	26·0 to 30·0	
Nickel	4·0 to 7·0	
Sulphur, *Max*	0·050	
Phosphorus, *Max*	0·050	

j) **Corrosion-Resistant Steel Castings**

Chemical Composition		Designation
Element	*Percent*	
Carbon	0·12 to 0·20	CSC 16 Cr 13
Silicon, *Max*	1·00	
Manganese, *Max*	1·00	
Nickel, *Max*	1·00	
Chromium	11·5 to 14·0	
Molybdenum, *Max*	0·50	

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Conversion*
Force	newton	N	1 N = 1 kg.1 m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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